of the apical region of the phyllode and not homologous with the blade of a dicotyledonous leaf. Such a blade among monocotyledons Mrs. ARBER calls a "pseudo-lamina." Such theories have been devised to explain the parallel venation of monocotyledonous leaves. Attention is also called to GRAY'S suggestion that some gymnosperm leaves may be equivalent to petioles, and the further suggestion made that this may be applied specially to the Gnetales.

These views were tested by Mrs. ARBER in anatomical investigations, comparing scale-leaves, petioles, and phyllodes of dicotyledons with the leaves of monocotyledons, the conclusion being reached that the occurrence of inverted vascular bundles toward the adaxial face of a leaf may be an indication of "phyllodic morphology." Other indications of phyllodic anatomy are developed, and its systematic distribution shows that it does not occur with any frequency outside the Helobiae, Liliiflorae, and Farinosae. This distribution is taken to confirm the view that phyllodic anatomy is an ancient character, revealing the origin of the monocotyledonous leaf.—J. M. C.

Stomata.—REHFOUS[11] has published a detailed study of the stomata of many groups. The details are too numerous for citation, but some of the general conclusions may be indicated. He is convinced that stomata are of first importance in indicating phylogeny and relationships. Their structure he claims is very constant within a group, numerous examples of this being given. For example, the structure of the stomata of the Amentiferae shows that they are nearer the level of the dicotyledons than of the gymnosperms or pteridophytes. In the same way it is shown that the Polypodiaceae constitute a special group, and that the Osmundaceae, Gleicheniaceae, and Schizeaceae approach more nearly the higher plants. A close resemblance is found between the stomata of cycads and conifers, leading to the conclusion that these groups are of common origin. Numerous illustrations of claimed relationships within great groups are either confirmed or contradicted. Several new types of stomata are described, among which those of *Polypodium*, *Platycerium*, *Cycas*, and *Casuarina* may be cited. In connection with the last named genus it is pointed out that its stomata are related to those of certain monocytoledons, as the grasses and certain of the xerophytic Liliaceae. The contribution is a valuable assemblage of facts in reference to the structure of stomata, accompanied by clear illustrations. The conclusions drawn from these facts are open to discussion.—J. M. C.

Water conduction in trees and shrubs.—FARMER[12] has published the results of an investigation of the comparative efficiency of the wood as a water-conducting tissue in about 60 species of plants, chiefly trees and shrubs. The

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[11] REHFOUS, LAURENT, Étude sur les stomates. Univ. Genève, Inst. Bot. IX. no. 6. pp. 110. *figs. 125.* 1917.

[12] FARMER, J. BRETLAND, On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Proc. Roy. Soc. B. **90**:218–250. 1918.

intake of water by the roots and its transpiration from the leaves have been much investigated, but "the behavior of the wood as the intervening conducting channel has almost entirely been neglected." The method used was to measure the amount of water passing in a given time and at standard pressure through a definite length of twig, the area of the cross-section of the wood being carefully measured. The paper includes two parts, one dealing with evergreens and the other with deciduous plants.

Some of the results are as follows. The specific conductivity of evergreens is relatively low, while that of deciduous plants is relatively high, and with a higher fluctuation. Some of the deciduous trees are more influenced by environmental conditions than are others. Considerable difference, in a lowering of conductivity, was found between the adult wood of the tree and that of "leaders" of young trees, a difference which becomes "exaggerated" in the main shoot of most climbers. The wood of arborescent monocotyledons was found to be defective in water-conductivity. The facts suggest that the lower conductivity of evergreens may be attributed to their narrow and short vessels.—J. M. C.

The Journal of General Physiology.—Many will welcome a new journal of general physiology.[13] Both plant and animal physiology have suffered from being too little related and treated as distinct subjects. Such a publication will aid in bringing them into closer relation. This journal is sure of sufficient financial support and no doubt able editorship. Its aim is stated as follows: "*The Journal of General Physiology* is devoted to the explanation of life phenomena on the basis of the physical and chemical constitution of living matter." The first number contains the following articles: On the dynamics of photosynthesis, W. J. V. OSTERHOUT and A. R. C. HAAS; A method of studying respiration, W. J. V. OSTERHOUT; The antagonism between thyroid and parethyroid glands, E. UHLENHUTH; Difference in the action of radium on green plants in the presence and absence of light, C. PACKARD; Amphoteric colloids, J. LOEB; A theory of the mechanism of disinfection, hemolysis, and similar processes, S. C. BROOKS; The law controlling the quantity of regeneration of the stem of *Bryophyllum calycinum*, J. LOEB; Reversal of reaction by means of strychnine in planarians and starfish, H. R. MOORE; Light and the muscle tonus of insects; the heliotropic mechanism, W. E. GARREY; Lutear cells and hen-feathering, ALICE M. BORING and T. H. MORGAN.—WM. CROCKER.

Embryo sac and fertilization in Oenothera.—ISHIKAWA[14] has investigated the behavior of the gametophytes and the fertilization phenomena in *O. nutans*

[13] The Journal of General Physiology, editors, JACQUES LOEB and W. J. V. OSTERHOUT. Published bimonthly by the Rockefeller Institute for Medical Research. Vol. I. No. 1. September 1918. Subscription $5.00.

[14] ISHIKAWA, M., Studies on the embryo sac and fertilization in *Oenothera*. Ann. Botany **32**:279–317. *pl. 7. figs. 14.* 1918.